

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A method for emulating a surface electrocardiogram (EKG) of a patient in which an implantable cardiac stimulation device is implanted, the method comprising:

sensing a single cross-chamber cardiac signal using an atrial electrode and a ventricular electrode;

distinguishing portions of the cross-chamber cardiac signal corresponding to atrial signals from those corresponding to ventricular signals; and

adjusting the relative amplitudes of the portions of the cross-chamber cardiac signal corresponding to atrial signals and the portions corresponding to ventricular signals so as to yield an emulated surface EKG using only the single cardiac signal with the adjusted relative amplitudes.

2. (Original) The method of claim 1 wherein adjusting the relative magnitudes of the portions of the cross-chamber cardiac signal is performed to yield a predetermined ratio of atrial peak signal amplitude to ventricular peak signal amplitude.

3. (Original) The method of claim 2 wherein the predetermined ratio is in the range of 1:4 to 1:10.

4. (Original) The method of claim 1 wherein distinguishing portions of the cross-chamber cardiac signal corresponding to atrial signals from those corresponding to ventricular signals comprises identifying transition points between atrial signals and ventricular signals within the cross-chamber cardiac signal.

5. (Original) The method of claim 4 wherein identifying transition points between atrial signals and ventricular signals comprises:

identifying a pair of ventricular depolarization and repolarization events within the cross-chamber cardiac signal;

scanning the cross-chamber cardiac signal prior to the ventricular depolarization event to find a baseline point to serve as a first transition point; and

scanning signals sensed following the ventricular repolarization event to find a nearest baseline point to serve as a second transition point.

6. (Original) The method of claim 4 wherein identifying transition points between atrial signals and ventricular signals comprises:

identifying a pair of ventricular depolarization and repolarization events within the cross-chamber cardiac signal;

scanning the cross-chamber cardiac signal prior to the ventricular depolarization event to find a baseline point to serve as a first transition point;

determining the R-R interval for the immediately preceding heart beat;

calculating a time delay value based on the R-R interval using a programmable factor; and

identifying a second baseline point based upon the time-delay value and the ventricular depolarization event.

7. (Original) The method of claim 1 further comprising controlling device functions based, in part, on the emulated surface EKG.

8. (Original) The method of claim 1 performed entirely by the implantable medical device.

9. (Original) The method of claim 1 performed by the implantable medical device in combination with a device external to the patient and further comprising transmitting the cross-chamber cardiac signal to the external device and wherein the steps of distinguishing portions of the cross-chamber cardiac signal and adjusting the relative amplitudes of the portions of the cross-chamber cardiac signal so as to yield an emulated surface EKG is performed by the external device.

10. (Previously Amended) The method of claim 1 wherein the atrial electrode is selected from the group consisting of: right atrial (RA) tip, RA ring, superior vena cava (SVC) coil, left atrial (LV) ring and LV coil and wherein the ventricular electrode is selected from the following group: right ventricular (RV) tip, RV ring, RV coil, left ventricular (LV) ring.

11. (Currently Amended) A system for emulating a surface electrocardiogram (EKG) of a patient in which the device is implanted, the system comprising:

sensing circuitry operative to sense a single cross-chamber cardiac signal; and
an EKG emulation unit operative to distinguish portions of the cross-chamber cardiac signal corresponding to atrial signals from those corresponding to ventricular signals and to adjust the relative amplitudes of the portions of the cross-chamber cardiac signal corresponding to atrial signals and the portions corresponding to ventricular signals so as to yield an emulated surface EKG using only the single cardiac signal with the adjusted relative amplitudes.

12. (Currently Amended) A system for emulating a surface electrocardiogram (EKG) of a patient in which the device is implanted, the system comprising:

means for sensing a single cross-chamber cardiac signal;
means for distinguishing portions of the cross-chamber cardiac signal corresponding to atrial signals from those corresponding to ventricular signals; and
means for adjusting the relative amplitudes of the portions of the cross-chamber cardiac signal corresponding to atrial signals and the portions corresponding to ventricular signals so as to yield an emulated surface EKG using only the single cardiac signal with the adjusted relative amplitudes.